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ABSTRACT

The study investigated the ability of 80 mildly mentally retarded students (19 to 17 years old) to make accurate judgments of textual idea importance and to differentially and spontaneously remember important rather than unimportant ideas. Ss were assigned to one of six conditions which differed as a function of whether importance judgments were made, whether Ss were given advance notice of later recall requirements, and the extent to which emphasis was placed on the potential usefulness of structural importance in aiding recall. Results indicated that the retarded Ss were more accurate in identifying unimportant ideas than important ideas, that learners recalled more of what they had rated as important than what they had rated as unimportant, and that learners did not spontaneously use importance levels to aid recall. Results are discussed in relation to a selective attention hypothesis. (Author)

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Identification and Recall of Structurally Important Units in Prose by Mentally Retarded Learners

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Identification and Recall of Structurally Important Units in Prose by Mentally Retarded Learners

The strategies which a reader uses in comprehending and recalling discourse are important determinants of what is remembered from prose (Campione & Brown, 1977; Flavell & Wellman, 1977). Similarly, poor memory performance in the mentally retarded may be caused by failures to exercise appropriate cognitive strategies (Borkowski & Wanschura, 1974; Brown, Campione, & Murphy, 1974; Kellas, Ashcraft, & Johnson, 1973; Murphy & Campione, 1974). Unfortunately, most research on the memory processes of retarded individuals has been conducted with nonsemantic stimuli. Thus, little is known about memory for discourse by retarded pupils.

One particular deficiency of the mentally retarded may be their failure to use the structural importance of textual ideas as a basis for organizing learning and recall. Recent investigations of prose have clearly indicated that good readers and comprehenders are sensitive to differing levels of text importance, and that ideational units high in importance are remembered best (Johnson, 1970; Meyer, 1975). However, it is not known whether retarded pupils attend selectively to differing levels of importance in prose. Even if such differentiations are absent, the possibility exists that the student possesses the capacity for making such differentiations but that he/she is not making use of the ability (Flavell, 1977). Training and practice of such a strategy and an assessment of the effects of using textual structural importance to aid recall can provide answers to these questions.

The present study investigates what is comprehended and recalled from discourse by mentally retarded pupils. More specifically, it asks whether

impairment of memory performance occurs because of failures in ability to glean useful and important information from prose. Furthermore, it investigates whether mentally retarded students will spontaneously use differing importance levels in text as an aid in recall once they are made aware that such a strategy may be a useful mnemonic device. Brown (1974) has demonstrated that learners are able to differentially utilize cognitive strategies in facilitating learning when the students are made aware of the utility in using the strategy. The task instructions in the present study were hypothesized to lead to differential sensitivity on the part of the retarded individuals to the usefulness of using importance judgments to aid recall.

Method

Subjects

Subjects in the study were 80 mildly retarded individuals and 16 normal children. The chronological ages of the retarded students ranged from 10.0 years to 17.0 years (Mean = 13.18, SD = 2.81). Table 1 shows the number of retarded students at the various age levels. The IQs of the retarded pupils were obtained from prior administrations of the S-B (1960 revision) or WISC by school psychologists within the preceding four-year period. Student IQs ranged from 50 to 73 (Mean = 63.7, SD = 9.15).

Insert Table 1 about here

The 16 nonretarded students who served as a control group were selected from second, third, and fourth grade public school classrooms and were matched for MA with the retarded students. All of the nonretarded students were reading between the 45th percentile and the 55th percentile on the

reading subtest of the Stanford Achievement Test.

As judged from the cumulative folders, the students were free of neurological handicaps, defects in hearing, and uncorrected visual defects. All participants resided in a home or foster home with a parent or guardian and attended school on a full-time basis. The mentally retarded students all were attending school in self-contained classes for the educable mentally retarded.

Materials

A 289-word fictional passage entitled "The Bank Robbery" was used. As judged by eight certified teachers of the mildly mentally retarded, the story was written at an appropriate reading and interest level for mildly mentally retarded students. Additionally, a pilot study conducted with 21 adolescent mildly retarded pupils indicated that the vocabulary included in the story was likely to be functional for retarded students.

Thirty-four college students at SUNY-Geneseo were presented with a copy of "The Bank Robbery" and were asked to make ratings of pausal acceptability (see Johnson, 1970). The boundary of an ideational unit was assumed when at least 66% of the raters indicated a given location would be an acceptable place for a pause. Fifty-seven pausal units were identified in the story.

Additionally, 32 other college raters judged the 57 idea units for structural importance, and a separate group of 32 raters judged the story units for stimulus saliency. Raters of structural importance were asked to judge each idea unit of the story on a scale from 1 to 7 with "1" being "least important" and "7" being "most important." Likewise, the group judging saliency was asked to rate the units on a similar 7-point scale. Mean importance and salience scores for each of the 57 idea units were

obtained, and the units were separately rank ordered for importance and saliency. Following the rank orderings, the units were subdivided into three categories of low, medium, and high importance. Likewise, the units were subdivided into three categories of low, medium, and high saliency. Nineteen units were contained in each category of structural importance and saliency. In an assessment of the reliability of ratings of structural importance and of stimulus saliency, the two groups of raters were split in half. A comparison of the ordering of importance of the 57 units showed a Pearson _r_ of .69. Comparison of the rankings of the two groups who made saliency judgments showed a _r_ of .93.

Procedure

A total of six groups were tested with the treatment conditions differing as a function of (1) whether importance ratings were made, (2) whether subjects were given advance notice of later recall requirements, and (3) the extent to which there was emphasis on the potential usefulness of structural importance in aiding recall. A summary of treatment variations may be seen in Table 2.

Insert Table 2 about here

Mentally retarded students were randomly assigned to one of five groups; the nonretarded pupils were assigned to a control group. The 96 participants all were tested individually. All students were informed that they would be hearing a story. A printed copy of the story was made available, and learners were encouraged to read the story as it was presented auditorily. The pupils were told that if they experienced difficulty in reading and listening, they could simply listen. Auditory presentation was slow enough to allow students

to read the text and listen to the story but not so slow as to destroy the meaning of the phrase units. While the story was being auditorily presented via tape recording, the experimenter sat next to the child and pointed to the appropriate words.

All subjects then heard and read "The Bank Robbery." Following this, subjects in the rating conditions received a second presentation of the story in which idea units were presented one at a time. For both stories, subjects who made importance ratings used a 3-point scale with "1" being "not important," "2" being "a little important," and "3" being "very important." The 3-point scale was utilized after pilot study data demonstrated that retarded students did not adequately handle the relative complexity of a 7-point scale.

Two groups did not make ratings of structural importance. In order to equalize number of presentations between groups, subjects in the nonrating groups heard and read the story a second time and responded to each presented idea unit by stating an alphabet letter.

After rating "The Bank Robbery" for structural importance or responding to the idea units with the letter task, all subjects heard and read the story once more. Immediately after this presentation, the students were instructed to orally recall the story into a tape recorder. Pilot data, however, revealed a general inability of retarded individuals to appropriately recall the story with an initial cue. Based on the data of the pilot study and the special learning characteristics of the subjects, all subjects were cued with the initial idea unit "one day." The first cuing unit of the story, a unit judged to be low in importance, was eliminated from further analysis. One unit apiece from each of the other two importance categories was eliminated to equalize the number of idea

units in each category.

Prior to hearing and reading "The Bank Robbery," all students listened to and read a practice story titled "The Fireman's Friend." This story was similar in length and vocabulary to "The Bank Robbery" and contained 62 idea units as judged by 32 independent college raters. Students in four of the six groups received training on making ratings of structural importance, made ratings on "Fireman's Friend," and received feedback as to the adequacy of their ratings. Students in the two control groups listened to and read the story but received no rating training and made no ratings.

Results

Ratings of Idea Units

Comparisons of the ratings of structural importance of idea subunits were made between the mentally retarded students and college judges. Guessing and accuracy scores were calculated for each learner's rating of structural importance. A guessing score reflected the differential tendency of students to rate idea units as belonging to a particular importance category, while accuracy scores reflected the sensitivity of the retarded raters in the appropriate placement of each idea unit as compared to the college judges. Since guessing and accuracy scores were represented as proportions, an arcsin transformation was performed on the data for the purpose of stabilizing the variances (Winer, 1971).

Differential use of the three importance categories (guessing scores) was reflected in a one-way repeated-measures analysis of variance on the guessing scores of the 64 retarded students who made structural importance ratings. The analysis revealed a significant difference between guessing scores at the three importance levels, $F(2, 126) = 50.64$, $p < .001$. The

high importance category was chosen significantly more often than either the medium or low importance category ($p < .05$). The low importance category was chosen significantly more than the medium importance category ($p < .05$). Thus, the mentally retarded students showed a tendency to identify units as being either important or unimportant.

The accuracy of the retarded students' choices as compared against the judgments of the college raters was analyzed by a 3 (level of structural importance) x 2 (guess vs. accuracy score) analysis of variance with repeated measures on both factors. The results indicated a significant main effect for importance level, $F(2, 126) = 50.64$, $p < .001$, score type, $F(1, 63) = 54.30$, $p < .001$, and the interaction term, $F(2, 126) = 25.96$, $p < .001$. A Newman-Keuls test revealed a significant difference between all importance/score type groups, $p < .01$, except for the difference between the high importance-guess scores and the high importance-accuracy scores, $p < .05$. The analysis indicated that the mentally retarded students were significantly more accurate in identifying units of low and medium structural importance than they were in identifying units of high structural importance, $p < .01$.

Recall of Idea Units

Recall of idea units was measured by having two independent judges analyze the tape-recorded protocols. An idea unit was said to have been recalled if the main idea or gist was expressed by the learner. Where judges disagreed on whether or not a unit had been recalled, the decision of a third judge was accepted. The interrater agreement between judges was $r = .98$.

A one-way analysis of variance provided comparison of the six

experimental groups on the total number of idea units that were recalled. The analysis revealed significant differences in the number of idea units recalled, $F(5, 95) = 6.35$, $p < .01$. The Newman-Keuls test revealed significantly superior recall by the normal control group when compared to the five mentally retarded groups, $p < .01$. Among the mentally retarded groups, the high emphasis group (group 6) recalled significantly more of the story than all other groups except for the group which made ratings of structural importance only (group 3). Group 3 recalled significantly more of the story than the retarded control group (group 2) and the low emphasis group (group 5). Groups 2, 4, and 5 did not differ significantly.

A 6 (group) x 3 (level of structural importance) analysis of variance with repeated measures on the second factor was conducted in order to judge the effects of structural importance on the recall of the story. A significant main effect was found for experimental groups, $F(5, 90) = 6.50$, $p < .001$. The interaction term was not significant. For all experimental groups, units high in structural importance were remembered significantly better than units low in structural importance. High importance and medium importance units did not differ significantly in magnitude of recall.

A 6 (group) x 3 (level of saliency) analysis of variance with repeated measures on the second factor was conducted to ascertain the degree of recall as related to the judged saliency or interest level of the idea units. A significant main effect was found for experimental groups, $F(5, 90) = 6.30$, $p < .001$, and level of saliency, $F(2, 180) = 22.67$, $p < .001$. For all groups combined, curvilinear relationship existed in that units judged to be of medium interest were remembered better than units judged to be high or low in interest level. The interaction term was not significant.

A final analysis examined levels of recall as a function of the degree

of structural importance judged by the 64 retarded students themselves. A 5 (mentally retarded groups) x 3 (level of structural importance) analysis of variance was conducted with repeated measures on the second factor. The results indicated a significant main effect for importance level, $F(2, 150) = 5.04$, $p < .008$. For all groups, idea units rated to be of high importance by the mentally retarded raters were remembered better than either units of medium importance or units of low importance, $p < .05$.

Discussion

The finding that the retarded individuals did relatively well in assessing importance was unexpected in light of findings reported by Brown and Smiley (1977). In that study, normal third-grade children were unable to reliably differentiate the relative structural importance of idea units in a folktale. However, while Brown and Smiley utilized Japanese folktales as reading material, the present study used a story more congruent with the life experiences and knowledge bases of the retarded students. It may have been that the retarded pupils were utilizing this knowledge in their rating choices.

The finding that the retarded students performed better in identifying units low in structural importance, along with the finding of relatively small differences between groups on recall of salient units, runs counter to predictions made by the stimulus saliency/selection attention hypothesis outlined by Zeaman and House (1963) and Fisher and Zeaman (1973). This hypothesis posits that retarded learners suffer from a selective attention deficit in that they pay more attention to unimportant but interesting dimensions of the task than to critical but perhaps less salient dimensions. This hypothesis would predict that the retarded raters would be relatively

inaccurate at rating units low in structural importance, presumably because they attended to the salient dimensions of the story. The current study, however, found that the retarded students were adept at identifying unimportant but salient units as being unimportant while demonstrating less accuracy in identifying units high in structural importance.

It should be kept in mind, however, that ratings of what was important and what was salient were made by the college students, and those ratings served as the benchmark against which the accuracy of the retarded pupils was ascertained. It may be that the college raters were relatively inaccurate in guessing what would be salient to retarded students. A future study might contain independent ratings by mentally retarded judges of the saliency of idea units of a story.

Recall

As shown by the recall data, informing students of later recall requirements of the task did not facilitate story recall. Likewise, neither telling learners once that an accurate use of structural importance in text can facilitate recall or informing students that an appropriate use of the differing levels of structural importance could facilitate recall aided the mentally retarded pupils in recalling the story. However, the students who received repeated instructions to use textual importance levels showed higher retention of the story than any other mentally retarded group.

The difference in remembering between the group that received repeated and intermittent instructions to judge importance and the group which received importance instructions only once suggests a probable production deficit rather than a mediational deficit (Flavell, 1971). According to Flavell (1977), a production deficit occurs when the individual possesses the

strategy in question in his/her response repertoire but does not use it spontaneously. On the other hand, a mediational deficit is said to exist when the subject cannot utilize the strategy even when the strategy is externally cued. Since the group which received repeated cuing to use importance judgments performed significantly better than the group which received instructions only once, a production deficit may be inferred. Based on these findings, it would appear that the strategy of focusing on importance judgments is a trainable one for mentally retarded learners.

The differential recall pattern between importance levels across experimental groups indicated that learners recalled more units rated by college judges to be high or medium in importance than units low in importance. This finding is interesting in light of the earlier analysis of the ratings showing that the mentally retarded students were better in identifying the units that were low in importance than in identifying the units that were high in importance. Although the retarded students could not reliably rate high importance units, they nevertheless were adept at recalling them. The finding that the students were better in recalling units high in importance than they were in rating them is similar to Brown and Smiley's (1977) outcome. In their study, Brown and Smiley found that third-grade, nonretarded children recalled more of the high importance units even though they could not accurately differentiate among the various levels of importance in their ratings. It appears that both mentally retarded individuals and third-grade pupils can recall what is important even though they may be unable to accurately abstract the main ideas in a rating task. Furthermore, since this outcome was evident for the four retarded groups which made importance ratings, this phenomenon appears to be independent of the training procedures used in the present study.

It has been proposed that the comprehension of a message is more than just knowing the meaning of a string of words (Carroll, 1972; Davis, 1968). Rather, comprehension occurs when the reader can adequately differentiate subordinate from superordinate and identify main ideas in discourse (Freedle, 1972). This implies that what is important in text comprehension is not the intended importance levels of ideas as they were designed by the author, but rather the perceived importance by the reader. Thus, in cases where the author and reader disagree on what is important and unimportant, the reader's perception may win out. If this is the case, then one educational implication to retarded learners may be the need to close the gap between intended importance levels of ideas by the author and perceived importance by retarded pupils. Like beauty, structural importance may be in the eye of the beholder.

References

Borkowski, J. G., & Wanschura, P. B. Mediational processes in the retarded. In N. R. Ellis (Ed.), International review of research in mental retardation (Vol. 7). New York: Academic Press, 1974.

Brown, A. L The role of strategic behavior in retardate memory. In N. R. Ellis (Ed.), International review of research in mental retardation (Vol. 7). New York: Academic Press, 1974.

Brown, A. L., Campione, J. C., & Murphy, M. D. Keeping track of changing variables: Long-term retention of a trained rehearsal strategy by retarded adolescents. American Journal of Mental Deficiency, 1974, 78, 446-453.

Brown, A. L., & Smiley, S. S. Rating the importance of structural units on prose passages: A problem of metacognitive development. Child Development, 1977, 48, 1-8.

Campione, J. C., & Brown, A. L. Memory and metamemory development in educable retarded children. In R. V. Kail & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Carroll, J. B. Defining language comprehension: Some speculations. In R. Freedle & J. Carroll (Eds.), Language comprehension and the acquisition of knowledge. New York: John Wiley & Sons, 1972.

Davis, F. B. Research in comprehension in reading. Reading Research Quarterly, 1968, 3, 499-545.

Fisher, M. A., & Zeaman, D. An attention-retention theory of retardate discrimination learning. In N. R. Ellis (Ed.), International review of research in mental retardation (Vol. 6). New York: Academic Press, 1973.

Flavell, J. H. Stage related properties of cognitive development. Cognitive Psychology, 1971, 2, 421-453.

Flavell, J. H. Cognitive development. Englewood Cliffs, N.J.: Prentice-Hall, 1977.

Flavell, J. H., & Wellman, H. M. Metamemory. In R. Kail & J. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.

Freedle, R. O. Language users as fallible information processors: Implications for measuring and modeling comprehension. In R. Freedle & J. Carroll (Eds.), Language comprehension and the acquisition of knowledge. New York: John Wiley & Sons, 1972.

Johnson, R. E. Recall of prose as a function of the structural importance of the linguistic units. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 12-20.

Kellas, G., Ashcraft, M., & Johnson, N. Rehearsal processes in the short-term memory performance of mildly retarded adolescents. American Journal of Mental Deficiency, 1973, 77, 670-679.

Meyer, B. F. Identification of the structure of prose and its implications for the study of reading and memory. Journal of Reading Behavior, 1975, 7, 7-47.

Murphy, M. D., & Campione, J. C. Measures of clustering in free recall. Unpublished manuscript, University of Illinois, 1974.

Winer, B. J. Statistical principles in experimental design (2nd ed.). New York: McGraw-Hill, 1971.

Zeaman, D., & House, B. J. The role of attention in retardate discrimination learning. In N. R. Ellis (Ed.), Handbook of mental deficiency. New York: McGraw-Hill, 1963.

Footnote

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Table 1

Mentally Retarded Student by Chronological Age

Chronological age	Number of students
10	1
11	5
12	21
13	30
14	17
15	4
16	1
17	1
	N = 80

Table 2

Experimental Design

Group	Expectation of recall	Performance of rating task	Emphasis regarding usefulness of rating task for later recall	Recall
I Normal (Control)	No	No	Not applicable	Yes
II Retarded (Control)	No	No	Not applicable	Yes
III Retarded (Ratings)	No	Yes	None	Yes
IV Retarded (Expectation)	Yes	Yes	None	Yes
V Retarded (Low emphasis)	Yes	Yes	Low	Yes
VI Retarded (High emphasis)	Yes	Yes	High	Yes